

HENRY HAROLD WELCH PEARSON, F.R.S.

A familiar figure with an almost boyish gait no longer tramps the Avenue, no longer climbs the winding stair, no longer tends The Gardens.

Henry Harold Welch Pearson lies at rest on the Cycad hill at Kirstenbosch.

It is hard, indeed, to contemplate this untimely loss, not only to South Africa, but to the botanical world in general, for the name of Pearson will for all time be associated with the great Cycad family, the Gnetales, and South Africa's National Gardens.

Pearson came to South Africa, a comparatively young man, some fourteen years ago; he has thus laid down a strenuous and fruitful life with an all too sudden suddenness.

Born at Long Sutton, Lincolnshire, in 1870, he died in Cape Town after a short illness on November 3, 1916. He was educated privately and matriculated in the University of London in 1889.

Entering the University of Cambridge as a non-collegiate student in October, 1893, he secured a First Class in Part I of the Natural Science Tripos, and entered Christ's College in 1896. In Part II of the Natural Science Tripos he again obtained a First Class, and was elected a Foundation Scholar and Darwin prizeman at his college. Almost immediately after this he proceeded to Ceylon as a Wort's Travelling Scholar of the University, and spent some six months there chiefly engaged on oecological studies. For his work in Ceylon he was awarded the Walsingham medal. He returned to Cambridge in 1898, and was appointed Assistant Curator of the University Herbarium under Marshall Ward, for whom he always bore the greatest admiration and respect. Very soon after this he was elected Frank Smart Student in Botany at Gonville and Caius College.

In 1899 he was appointed Assistant for India in the Herbarium at Kew.

In 1903 he came to South Africa to fill the newly-founded Harry Bolus Chair of Botany at the South African College, Cape Town, and ten years later he combined this post with that of Honorary Director of the National Botanic Gardens at Kirstenbosch.

The field of investigation covered by Pearson includes work of first-class importance dealing with histology, physiology, oecology, and geographical distribution; in fact, it was characteristic of him that he always attempted to look at the problem he had in hand from all points of view.

His first published paper dealt with the anatomy of the seedling of

Bowenia, a remarkable Australian Cycad, and even at that time it is clear that many problems relating to the physiology and oecology of the Cycads must have been prominent in his mind. This was Pearson's first piece of research work at Cambridge and it is interesting to note that he never forsook this group, which had for him a peculiar fascination.

His account of the botany of the Ceylon Patanas is of exceptional interest to the South African botanist in that the flora of the Patanas bears in many respects a striking resemblance to that of the High Veld in South Africa, and one regrets that other duties and strenuous work prevented Pearson from pursuing the oecological studies begun in Ceylon further with respect to the grassland of this country, especially as the same problems and questions that presented themselves in Ceylon must have occurred again and again to him here.

His study of the Patana vegetation aroused an interest in Xerophytes, which he retained to the end. In particular, he drew attention to the absence of plants with bulbs or tubers from the flora of the dry Patanas, and in this respect it must have formed a striking contrast to that which he encountered in his travels in South Africa.

While at Kew Pearson was engaged chiefly in systematic botany, but he also undertook a morphological study of the double pitchers found in certain members of the genus *Dischidia*, and from his examination of dried and scanty material, he put forward the novel theory that the double pitchers represented Xerophytic characters. His systematic work included the working up of the Verbenaceae for the 'Flora Capensis.'

Coming to South Africa in 1903, Pearson's first botanical publications dealt with the Verbenaceae, and very soon afterwards he published an instructive and useful paper on the South African Cycads.

At an early date he turned his attention to the study of the flora of South-West Africa, where he travelled and explored the desert regions inhabited by *Welwitschia* and other no less remarkable Xerophytes. His observations on *Welwitschia* were not confined to the field, but were supplemented by a series of classical papers detailing the results of anatomical and histological studies. He first made himself thoroughly familiar with the natural history of the plant, journeying to Damaraland on no less than three occasions solely with the object of studying it in the field.

As a result of these observations he concluded that full-grown plants reached an age of considerably over a hundred years, that they were pollinated by insects, and that when growing in contact they frequently formed natural grafts. The material which was acquired on these different expeditions formed the basis for a most exhaustive study in his laboratory at Cape Town of the details connected with the process of fertilisation in *Welwitschia*, and conclusions of extraordinary interest relating to the organisation and structure of the endosperm were put forward by Pearson.

His paper on the subject communicated to the Royal Society of London may well be regarded as his masterpiece. It is here that he cleverly disposed of a puzzling and troublesome structure by his term "trophophyte."

In like manner in his first paper, also communicated to the Royal Society, he was responsible for introducing the term "prothallial-tube."

At this time, when he was so actively engaged in the histological study of the endosperm of *Welwitschia*, he had naturally taken advantage of the enthusiasm which he had instilled into his more promising students to prosecute research of a similar nature amongst other South African genera, and during this time a series of papers dealing with the development of the embryo-sac appeared.

Pearson's observations on *Welwitschia* at once raised many points with regard to its alliance with *Gnetum* and their affinity to the Angiosperms. Both these phases he entered into fully, and even predicted that *Gnetum* would show similar fertilisation phenomena as pertained in *Welwitschia*.

Having disposed of the botanical details of the fertilisation of *Welwitschia*, Pearson with characteristic thoroughness turned his attention to *Gnetum*. Here again the first step that he undertook was a study of the life-history of *Gnetum africanum*. With this object in view he visited Angola in 1909, and obtained material for such an investigation as he had previously carried out on *Welwitschia*.

From his examination of *Gnetum africanum* and two other species he concluded that *Gnetum* showed a much closer degree of affinity with *Welwitschia* than with *Ephedra*. His first paper left many interesting points in connection with the male gametophyte still to be cleared up. By this time *Gnetum* was being examined by several workers, and before Pearson's second paper on *Gnetum* dealing with the morphology of the inflorescence and flower appeared, Thompson in America published the results of his examination of the embryo-sac and male gametophyte, from which it was evident that the conditions in *Gnetum* resembled those in *Welwitschia*, as Pearson had many years before predicted.

Pearson, however, had not been slow in unravelling the puzzling and difficult histological details connected with the reproduction of *Gnetum*, for, in his paper presented to the Linnean Society on June 4, 1914, he showed very clearly that "the primary endosperm of *Gnetum* is in all respects homologous with the primary endosperm of *Welwitschia*," and his suggestions that such fertilisation phenomena might be associated with the polar nuclei in Angiosperms have given rise to much reasonable discussion and speculation on these points.

Two further papers on *Gnetum* were written by Pearson prior to his death, and are as yet still in the press.

Pearson, in his travels in South-West Africa, did not confine himself to the mere collection of material for further study in the laboratory or com-

parison in the herbarium, but he set himself to inquire in the field into certain definite physiological phenomena connected with the internal temperatures of plants growing under desert conditions. Observations made in December on *Euphorbia virosa* and *Aloe dichotoma* revealed the fact that the internal temperature of the former rose as high as 51.5°C . *Euphorbia* also showed an excess of internal temperature over that of shade by 15.35°C ., while *Aloe* did not vary more than 5°C . He further made the interesting observation that when wounded a considerable drop in internal temperature took place in *Euphorbia*; this, Pearson explained, was partly due to evaporation at the wound and partly to the expansion of gas in the air chambers.

In addition to his more purely scientific work Pearson also undertook an investigation of the "Witchweed," a phanerogamic parasite which was causing damage to maize crops in the Transvaal. The botanical characters of the parasite were soon worked out with a skill and clearness of vision that were characteristic of the man, but through no fault of his no practical solution to the problem was arrived at.

As a lecturer Pearson had that rare gift of ready and lucid exposition. He thought quickly and clearly. He took an active though unobtrusive part in the affairs of the Cape of Good Hope University, and latterly was much absorbed in the selection of the site of the University of Cape Town on the Groot Schuur Estate and its future relationship to the National Botanic Gardens.

To the South African public Pearson was best known as the Director of the National Gardens at Kirstenbosch, which office he filled in an honorary capacity, and nothing pleased him more when opportunity arose than to show both local and distant visitors the work that was then in hand at the Gardens and discuss plans and possibilities for the future, always both humorous and courteous to all alike.

By Pearson's untimely death the Royal Societies of both London and South Africa have been robbed of a Fellow whose name will always rank with those of Thunberg, Burchell, Ecklon, Zeyher, Drège, and Bolus, whether he be regarded as a naturalist, botanist, traveller, explorer, or teacher.

He is lamented by all who knew him, and it is difficult to contemplate Cape Town and the National Gardens without his cheery and enlivening presence. Ill could the country afford to lose him. I. B. P. E.

LIST OF PAPERS.

- 1898. "Anatomy of the Seedling of *Bowenia spectabilis*," Hook, f. ('Ann. Bot.,' xii, pp. 475-490, tt. 27-28).
- 1898. "Apogeotropic Roots of *Bowenia spectabilis*," Hook, f. ('Rep. Brit. Assoc. Adv. Sci.,' p. 1066).

- 1899 & 1903. "Botany of the Ceylon Patanas," part 1 ('Journ. Linn. Soc.,' vol. xxxiv., pp. 300-365, with map); part 2, by J. Parkin and H. H. W. P. (*loc. cit.*, vol. xxxv, pp. 430-463, tt. 11-12).
1900. "S. Hedin's Reisen in Zentralasien: die botanischen Ergebnisse," bearbeitet von W. Botting Hemsley and H. H. W. P. ('Petermann's Geogr. Mitteil. Ergänzungsbl.,' xxviii, pp. 372-375).
1901. "Description of *Clerodendron Curtisii*" ('Kew Bulletin,' p. 142).
1901. "On a Small Collection of Dried Plants obtained by Sir Martin Conway in the Bolivian Andes," by W. Botting Hemsley and H. H. W. P. ('Journ. Linn. Soc.,' vol. xxxv, pp. 78-90, with map).
1901. "The Flora of Tibet or High Asia, being a Consolidated Account of the various Tibetan Botanical Collections in the Herbarium of the Royal Gardens, Kew, together with an Exposition of what is known of the Flora of Tibet," by W. Botting Hemsley, assisted by H. H. W. P. ('Journ. Linn. Soc.,' vol. xxxv, pp. 124-265, with map).
- 1900 & 1901. "Descriptions of *Cochlearia Hobsoni*, *Geophila pilosa*, *Cuscuta Hygrophilae*, *Pentaphragma albiflorum*, and *Vitex mooiensis*" (Hook., 'Ic. Plant,' vol. xxvii, tt. 2643, 2691; vol. xxviii, tt. 2704-2706).
- 1901 & 1910. "Verbenaceae (of South Africa)" (Dyer, 'Flora Capensis,' vol. v, sect. 1, pp. 180-226).
1902. "On some Species of *Dischidia* with double Pitchers" ('Journ. Linn. Soc.,' vol. xxxv, pp. 375-390, t. 9).
1903. "The Teaching of Botany" ('Rep. S. African Assoc. Adv. Sci.,' pp. 312-316).
1903. "The Double Pitchers of *Dischidia Shelfordii*" ('Ann. Bot.,' vol. xvii, pp. 617-618).
1905. "South African Verbenaceae" ('Trans. S. African Phil. Soc.,' vol. xv, pp. 175-182).
- 1905 & 1906. "Notes on some South African Cycads" ('Rep. S. African Assoc. Adv. Sci.,' p. 260; 'Trans. S. African Phil. Soc.,' vol. xvi, pp. 341-354, tt. 6-8 and 1 text-fig.).
1906. "Some South African Cycads: their habitats, habits, and associates" ('Rep. Brit. Assoc. Adv. Sci.,' pp. 738-739).
1906. "Some Observations on *Welwitschia mirabilis*," Hooker f. ('Phil. Trans. R. Soc. B.,' vol. cxviii, pp. 265-304, tt. 18-22).
1906. "Descriptions of *Connaropsis acuminata*, *Cuscuta Upcraftii*, *Euthemis ciliata*, *Semecarpus cinerea*, and *Swintonia puberula*" ('Kew Bulletin,' pp. 2-5).
1907. "The Living *Welwitschia*" ('Nature,' vol. lxxv, pp. 536-537, with 3 figs.).
1907. "A Botanical Excursion in the Welwitschia Desert" ('Rep. Brit. Assoc. Adv. Sci.,' p. 685).

1907. "Some Observations on the *Welwitschia* Desert" (abstract) ('Rep. S. African Assoc. Adv. Sci.,' p. 116).
1907. "Research on South African Cycads and on *Welwitschia*": Report to the Committee ('Rep. Brit. Assoc. Adv. Sci.,' pp. 408-409).
1908. "A Note on the Morphology of Endosperm" ('Rep. Brit. Assoc. Adv. Sci.,' p. 914).
- 1908 & 1909. "Further Observations on *Welwitschia*" ('Proc. R. Soc. Lond. B.,' vol. xxx, pp. 530-531; 'Phil. Trans. R. Soc. Lond. B,' vol. cc, pp. 331-402, tt. 22-30). (Abstract.)
1909. "A Botanical Journey in South-West Africa" ('Gard. Chron.,' vol. lvi, pp. 369-370, 401-402, 414-415, figs. 160, 160 a, 176-178, 182-184).
1909. "Percy Sladen Memorial Expedition in South-West Africa, 1908-9" ('Nature,' vol. lxxxi, pp. 466-467, 499-500, with 4 figs. and 2 sketch-maps).
1910. "The Travels of a Botanist in South-West Africa: Percy Sladen Memorial Expedition, 1908-9" ('Geogr. Journ.,' vol. xxxv, pp. 481-511, with 12 figs.).
1910. "*Welwitschia mirabilis*" ('Gard. Chron.,' xlvii, pp. 49-51, figs. 31-33 and Suppl. illust.).
1910. "A National Botanic Garden (for South Africa)": Presidential Address ('Rep. S. African Assoc. Adv. Sci.,' pp. 37-54; abstract in 'Kew Bulletin,' pp. 372-380).
1910. "The Embryo of *Welwitschia*" ('Ann. Bot.,' vol. xxiv, pp. 759-766, t. 64 and 2 text-figs.).
1910. "Thymelaeaceae (of Tropical Africa)" (Dyer, 'Flora of Tropical Africa,' vol. vi, sect. 1, pp. 212-255).
1911. "Preliminary Report on an Investigation of the Life-History of the Rooibloem or Witchweed (*Striga lutea*, Lour.)" ('Agric. Journ. Union S. Africa,' vol. ii, pp. 266-268).
1911. "A State Botanic Garden" ('The State of South Africa.')
1911. "Harry Bolus, D.Sc., F.L.S. (Obituary Notice, with a list of his botanical journeys, by L. Kensit, and a bibliography)" ('Rep. S. African Adv. Sci.,' pp. 67-79, with portrait).
1911. "Through Little Namaqualand with the Vasculum and the Camera" ('Gard. Chron.,' vol. l, pp. 61, 62, 124-125, 166-167, 190-191, 200-201, figs. 30-33, 57-61, 79-81, 89-91, 97-99).
1911. "On the Collections of Dried Plants obtained in South-West Africa by the Percy Sladen Memorial Expeditions, 1908-1911" ('Ann. S. African Mus.,' vol. ix, pp. 1-19, with map).
1911. "Itinerary of the Percy Sladen Memorial Expedition to the Orange River, 1910-1911" ('Ann. S. African Mus.,' vol. ix, 1911, pp. 21-90, tt. 1-2).

1912. "La Vaillant's Grotto at Heerenlogement" ('Geogr. Journ.,' vol. xxxix, pp. 40-47, with sketch-map and 3 figs.).
1912. "On the Microsporangium and Microspore of *Gnetum*, with some Notes on the Structure of the Inflorescence" ('Ann. Bot.,' vol. xxvi, pp. 603-620, t. 60, and 6 text-figs.).
- 1912 & 1913. "List of Plants collected in the Percy Sladen Memorial Expeditions, 1908-9, 1910-11 (Portulacaceae), by H. H. W. P. and E. L. Stephens" ('Ann. S. African Mus.,' vol. ix, pp. 30-35); Verbenaceae (*loc. cit.*, vol. ix, pp. 183-184).
1912. "On the Rooibloem (Isona or Witchweed)" ('Agric. Journ. Union S. Africa,' vol. iii, pp. 651-655; 'Union S. Africa, Dep. Agric.' (leaflet), no. 30, pp. 1-7).
1913. "The Problem of the Witchweed" ('Agric. Journ. S. Africa,' vol. vi, pp. 803-805; 'Union S. Africa, Dep. Agric.' (leaflet), no. 40, (pp. 1-34, with 9 figs.).
1913. "Note on the Localities visited by the Percy Sladen Memorial Expedition to the Khamiesberg, Giftberg, and Oliphant's River Mountains, September, 1911" ('Ann. S. African Mus.,' vol. ix, pp. 129-131).
1913. "The National Botanic Garden (for South Africa)" ('Gard. Chron.,' vol. liv., pp. 150-151, with sketch map).
1914. "On the Flora of the Great Karasberg": Introduction ('Ann. Bolus Herb.,' vol. i, pp. 1-8).
1914. "Observations on the Internal Temperatures of *Euphorbia virosa* and *Aloe dichotoma*" ('Ann. Bolus. Herb.,' vol. i, pp. 41-66).
1915. "Note on the Inflorescence and Flower of *Gnetum*" ('Ann. Bolus Herb.,' vol. i, pp. 152-172, tt. 24-26).
1915. "Communication on the Experimental Use of Plants for Fixing Moving Sand" ('Min. Pro. of the S. African Soc. Civil Engineers,' pp. 268-270).
1915. "Notes on the Morphology of Certain Structures concerned in Reproduction in the Genus *Gnetum*" ('Journ. Linn. Soc.,' vol. xliii, pp. 55-56).

WORKS.

1914-16. Editor of:

- (1) 'Annals of the Bolus Herbarium,' vols. i-ii, part 1.
- (2) 'Journal of the Botanical Society of South Africa.'